Large Antibioma Resulting from Injudicious Use of Antibiotics: A Case Report

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ABSTRACT

Antibiotics are commonly used in dental practice. It has been estimated that 10% of all antibiotic prescriptions are related with dental infections. Antibiotic resistance is an increasingly serious problem. One of the causes is the injudicious prescription of antibiotics for self-limited infections. Doctor often cite patient`s pressure as factors in their decisions to prescribe antibiotics for dental infection. This article aims to minimize the injudicious use and prescription of antibiotic in dental infection and also doctor's perception of patient's expectations regarding antibiotic use is also discussed. Doctors and patients demonstrate negligence regarding antibiotic use and appropriate treatment protocol should be followed.

KEYWORDS: Antibiotic, Dental Infection, Negligence, Résistance, Self-limited Infections

INTRODUCTION

Antibiotic resistance is a natural phenomenon-resistance strains a micro organism have been noted close on the heels of antimicrobial discovery.[1] It is undeniable that antibiotic use (and overuse) contributes to development of resistance. Injudicious use of antibiotics for human has long been recognized as a global problem. While over the counter access to antibiotics is mentioned as an important contributor towards injudicious antibiotic use in developing nations, as shown in number of studied there are many provider, practice and patient characteristic which drive antibiotic overuse in developed nation such as United States. Numerous approaches have been proposed as a solution to this complex, multi factorial problem while some countries have shown a striking improvement in antibiotic use. [2, 3]

PARTICULARITIES OF USE OF ANTIBIOTICS IN DENTISTRY

There are particular characteristics of antibiotic use in dentistry. In practice antibiotic prescription is without the dentist knowing the microorganism causing the infection as any pus or draining exudate not usually go under culture sensitivity tests. On the basis of microbial epidemiology and clinical data the microbes responsible are suspected and on this basis treatment is decided.[4] Resulting in use of broad spectrum antibiotics. A wide category of microbes can be isolated from the oral microbial flora and as we know all of them are not potent for pathogenesis. Although the list of bacteria causing oral infections is long (aerobes, anaerobes, bacilli, cocci, gram positive as well as gram negative) but as discussed above a limited range of antibiotics is used typically, at times only a few. As a result of use of broad spectrum antibiotics prescriptions are specifically given for a shorter period of time as not exceeding 7 days. There is a growth in the resistant strains of bacteria found in the oral cavity due to decrease in the antibiotic sensitivity testing especially Prevotella and Porphyromona.[5] Studies also reported resistance of streptococcus viridians and for antibiotics such as penicillin, clindamycin and macrolides.[6,7]

CASE REPORT

A 16 year old female reported to the department of oral and maxillofacial surgery in M.A.Rangoonwala dental college with an extra oral swelling.(figure.1)

Patient gave history of swelling with mandibular left molar and was treated with extraction of offending tooth followed by antibiotic coverage. (Tab. Cefixime 200 mg twice a day and tab. Metronidazole 400mg thrice a day and tab. Diclofenac (50mg) +Paracetamol (500mg) for 5 days thrice a day) After 5 days patient noticed that the swelling did not reduce, and she continued taking antibiotic off and on for the swelling for 1 month.

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Figure.1 -Profile pic pre-operative

Figure.2 b-Incisiona drainage intraorally

After 1 month she reported with a hard extra oral swelling measuring, 1.5*2 cm in diameter in the region extending superio-inferiorly from ala tragus line to lower border of the mandible and anterio-postereriorly from corner of mouth to angle of mandible. Swelling was hard in consistency and non-tender on palpation.

Patient was treated for the same by incision and drainage intra orally in the left mandibular molar region. Vestibular incision was made extending from first molar to the second molar around 1cm in length. Blunt dissection was done with artery forceps and spaces were explored. Exudate was drained and irrigation was done with povi done iodine and normal saline. Povidone iodine soaked gauze drain was placed into the tunnel which was created intra orally in left mandibular molar region (Figure.2a,b).

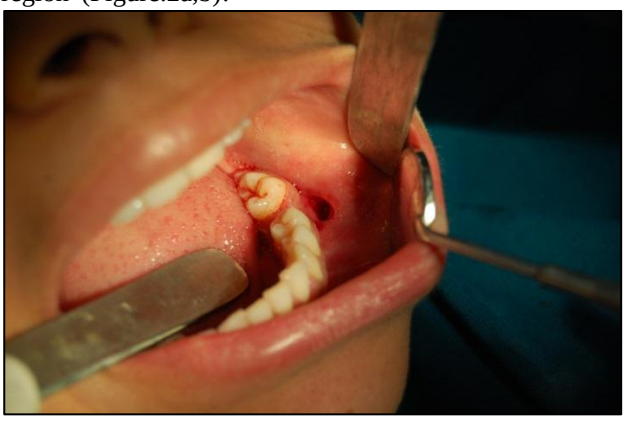

Figure.2 b-Incisiona drainage intraorally

After incision and drainage, medication started amoxicillin+clavulanic acid 625mg thrice a day and diclofenac sodium (50mg) +paracetamol (500mg) thrice a day for 5 days. Follow up was done on the 1st, 2nd, 3rd, 5th & 7th post of day and dressing was changed. The povidone iodine soaked gauze was changed on 1st and 2nd postoperative day and was discontinued afterward which was followed by povidone iodine and normal saline irrigation.

The size of swelling was observed on each postoperative day. Swelling was noticeably increased on the 1st postoperative day which gradually resolved till the 8th postoperative day (figure.3,4).

Figure.3- 1st day postoperative

Figure.4 - 8th day postoperative

DISCUSSION

In this study, patient was treated only for symptomatically which included extraction of offending tooth. The underlying pathology (pus) was not drained after tooth extraction and proper instruction of antibiotics and proper follow-up was not done, which lead to the condition known as antibioma.

If proper drainage of pus is not established and treated only by antibiotics, pus localises and becomes sterile (flaques) with a thick fibrous tissue cover. This leads to condition is known as antibioma. It is characterized by swelling which is painless, smooth, non-tender, and hard on palpation. FNAC of the swelling is a diagnostic test to confirm antibioma. Treatment for this is excision or

incision and drainage which can be supported with antibiotics for the same.

Development of Antibacterial Drug Resistance: Along with the dramatic benefits of systemic antibiotics, there has also been an explosion in the number of bacteria that have become resistant to a variety of these drugs. The problem is not the antibiotics themselves. They remain one of medicine's most potent weapons against diseases. Instead, the problem is in the way the drugs are used. The inappropriate overuse of antibiotics has resulted in a crisis situation due to bacterial mutations developing resistant strains. Many worldwide strains of *Staphylococcus aureus* exhibit resistance to all medically important antibacterial drugs, including vancomycin, and methicillin-resistant *S. aureus*has become one of the most frequent nosocomial, or hospital-acquired, pathogens. The rate at which bacteria develop resistance to antibacterial drugs is alarming, demonstrating resistance soon after new drugs have been introduced. This rapid development of resistance has contributed significantly to the morbidity and mortality of infectious diseases.[8]

When to Prescribe Antibioticbiotics? Injudicious use of antibiotics is the most prompt drawback to the proved benefits of the antibiotics. As there unintended consequences such as gastric, haematological, dermatological, neurologiacal, allergic or other disorders, So is of great importance the development of resistance to anti-microbial drugs for the human health.– the paradigm in this case being the ß-lactamase producing bacterial strains. As was demonstrated by Kuriyama et al. ß-lactamase producing bacteria are isolated with increased frequency from the purulent exudates of odontogenic infections in patients that have received previous treatment with beta-lactams, and the longer the duration of such prior treatment the greater the number of resistant bacterial strains isolated. Rational antibiotic use is thus required in dental and oral clinical practice, to ensure maximum efficacy while at the same time minimizing the side effects and the appearance of resistances. Antibiotics are typically prescribed in dental practice for some of the following purposes: (a) as treatment for acute odontogenic infections; (b) as treatment for non-odontogenic infections; (c) as prophylaxis against focal infection in patients at risk (endocarditis and joint prostheses); and (d) as prophylaxis against local infection and systemic spread in oral surgery.[9]

Treatment of Acute Odontogenic Infection: Despite the high incidence of odontogenic infections, there are no uniform criteria regarding the use of antibiotics to treat them. Bascones et al. [10], in a consensus document on the subject, suggested that treatment should be provided in some acute situations of odontogenic infection of pulp origin as a complement to root canal treatment, in ulcerative necrotizing gingivitis, in periapical abscesses, in aggressive periodontitis, and in severe infections of the fascial layers and deep tissues of the head and neck. They do not recommend antibiotic treatment in chronic gingivitis or periodontal abscesses (except in the presence of dissemination). There is considerable agreement that the beta-lactam derivatives are the antibiotics of choice for these processes, provided there are no allergies or intolerances. However, there are fewer consensuses regarding which drug belonging this family should be prescribed. While some authors consider the natural and semi synthetic penicillin (amoxicillin) to be the options of first choice,[11] others prefer the association amoxicillin-clavulanate, due to the growing number of bacterial resistance, as well as its broad spectrum, pharmacokinetic profile, tolerance and dosing characteristics.[12] As has been commented above, some authors have proposed clindamycin as the drug of choice, in view of its good absorption, low incidence of bacterial resistances, and the high antibiotic concentrations reached in bone. [13]

Antibiotic prescription is almost invariably associated with the prescription of nonsteroidal anti-inflammatory drugs (NSAIDs). There are many potential interactions between these two drug categories – the most common situation being an NSAID-mediated reduction of antibiotic bioavailability and thus effect, [14,15] though some combinations of drugs such as cephalosporins and ibuprofen, or tetracycline with naproxen or diclofenac, have been shown to exert the opposite effect, i.e., an increase in the bioavailability of the antibiotic. [16,17]

Following principles of antibiotic dosing are adapted from Dr. Thomas J. Pallasch: [18]

1) The current recommendation is to employ an antimicrobial on an intensive basis with vigorous dosage for as short a period of time as the clinical situation permits. The major factor in the clinical success of most antimicrobial agents is the height of the serum concentration of the drug and the resulting amount in the infected tissue(s). Also important is to expose the host to the antimicrobial agent for as short duration of therapy as possible. The shorter the duration of therapy the lower the risk to the patient for the development of antibiotic-induced toxicity and/or allergy, and a reduced risk of developing resistant microorganisms.

2) The goal of antibiotic dosing is to achieve drug levels in the infected tissue equal to or exceeding the minimal inhibitory concentration of the target organism. Serum levels of antibiotics do not necessarily reflect those in tissues. Blood concentrations of the antibiotic should exceed the MIC by a factor of two to eight times in order to offset the tissue barriers that restrict access of the drug to the infected site.

3) It is advisable to initiate antibiotic therapy with a loading dose (an initial dose higher than the maintenance dose). An antibiotic loading dose should be used whenever the half-life of the drug is longer than three hours or whenever a delay of 12 hours or longer to achieve a therapeutic blood level is expected. Most antibiotics used in the treatment of orofacial infections have a half-life shorter than three hours but, due to their acute nature, most orofacial infections require therapeutic drug blood levels sooner than 12 hours. Steady-state blood levels of any drug are usually achieved in a time equal to three to five times the drug's half-life.

Amoxicillin has a half-life of one to one-and-a-half hours. A steady-state blood level would then be achieved in three to seven-and-a-half hours thereby leading to a substantial delay in achieving therapeutic antibiotic blood levels. A loading dose of two times the maintenance dose is recommended for acute orofacial infections, which better achieves the goal of rapid, high blood levels rather than initiating therapy with the maintenance dose.

4) An oral antibiotic should ideally be administered at dosing intervals of three to four times its serum half-life, particularly if steady-state blood levels are desired (as may be indicated with beta-lactam agents). For example, the serum half-life of Pen-V-K is 0.75 hours. Higher continuous blood levels of this antibiotic are more likely to be obtained with four-hour rather than six-hour dosing intervals. The shorter the serum half-life of the drug, the shorter the dosing interval will need to be in order to maintain continuous therapeutic blood levels of the drug.

When determining the appropriate dosing interval, it is also important to consider the following: 1) The post antibiotic effects of the drug; and 2) the relative merits of continuous or pulse dosing. PAEs are more persistent (two to seven hours) with antibiotics that act intracellular within the microbial cytoplasm (erythromycin, clindamycin and tetracycline) or by suppression of nucleic acid synthesis (metronidazole, quinolones). As a result, these antibiotics are more effective with pulse dosing (high antibiotic dosing at widely spaced intervals). The beta-lactam antibiotics however, have a slow, time-dependent killing activity and demonstrate very little PAE. Beta-lactam microbial killing requires microbes in the process of cell division (interference with cell wall development); hence, they must be continuously present (steady-state blood levels) because bacteria divide at different rates or times.

CONCLUSION

Doctor demonstrates negligence regarding appropriate antibiotic prescribing for odontogenic infections. Doctors are unable to judge patients' expectations accurately. Educational efforts aimed at both doctor and patients hold the most promise in decreasing unnecessary antibiotic use. These efforts include raising knowledge of doctors that patient satisfaction is generally linked much more to communication than to the writing of a prescription. Appropriate treatment protocol should be followed.

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